

Epitomes

Important Advances in Clinical Medicine

Occupational Medicine

The Scientific Board of the California Medical Association presents the following inventory of items of progress in occupational medicine. Each item, in the judgment of a panel of knowledgeable physicians, has recently become reasonably firmly established, both as to scientific fact and important clinical significance. The items are presented in simple epitome and an authoritative reference, both to the item itself and to the subject as a whole, is generally given for those who may be unfamiliar with a particular item. The purpose is to assist busy practitioners, students, research workers or scholars to stay abreast of these items of progress in occupational medicine that have recently achieved a substantial degree of authoritative acceptance, whether in their own field of special interest or another.

The items of progress listed below were selected by the Advisory Panel to the Section on Occupational Medicine of the California Medical Association and the summaries were prepared under its direction.

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Male Reproductive Hazards

IN 1977 workers in a California pesticide plant noted the few number of children fathered by employees in a specific department. There were no abnormal physical or laboratory findings except for extremely low sperm counts. Now seven separate studies have been completed on male workers who were exposed to dibromochloropropane (DBCP). Although the data are still incomplete, about 15% of men exposed to dibromochloropropane are azoospermic and another 21% are oligospermic. These observations have led to an explosion of interest in chemical and environmental agents that affect sperm and the agents currently known to affect male reproduction have recently been summarized by Whorton in this journal.

Despite the importance of studying male reproductive function, little is known about screening procedures for known and potential hazards. With a high vasectomy rate, an aging work force and variable sperm assay procedures, it has become increasingly difficult to define a "normal" sperm count. Alcohol and cigarette smoke may provide a background of abnormal findings difficult to separate from those of toxic exposure. Questionnaires for monitoring male workers for fertility have been proposed by Levine and others. Although such methods might be valid for severe reproductive toxins such as dibromochloropropane, their validity for evaluating more subtle changes must be studied further.

Male reproductive hazards can also cause loss of libido, impotence, testicular anatomic abnormalities or alteration of seminal secretions—all of which can be missed when only sperm is analyzed. As more information is reported, it is remarkable to note the increasing

number of factors affecting sperm. These include nutrition, temperature, vibration and noise exposure, anti-sperm and antibodies. Another concern is the possible transplacental hazards of drugs or chemicals such as diethylstilbestrol (DES) on developing male testes. Clear cell adenocarcinoma of the vagina in adolescent girls has been described in female offspring of DES-treated mothers. Transplacental effects of diethylstilbestrol on testes have also been reported. Interactions of chemicals, drugs and environmental factors must be studied for a clear understanding of the significance of work-place exposures.

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Reproductive Hazards in the Workplace

THE ROLE of occupational exposures is receiving increasing attention in medical literature. Whereas patient histories contain detailed information about medications, smoking and alcohol consumption, information concerning possible workplace exposures to lead, mercury, solvents, pesticides, heat, radiation and biologic agents is usually absent or vastly inadequate.

Research in recent years has expanded the concept of the "at risk" worker, which previously focused on the traditional blue collar trades. Today workers in agriculture and service occupations, including those in

hospitals and laboratories, are being studied. Numerous investigators during the past decade have reported an increased incidence of spontaneous abortions and birth defects among female operating room personnel. The increased frequency of congenital malformations in the offspring of male anesthetists heightened interest in the impact of a father's occupational exposures on reproductive outcome. The latter findings have since been shown in other epidemiologic studies and supported by extensive studies in animals. The offending agent in the case of operating room personnel was believed to be anesthetic gases. Rather than excluding workers, measures were instituted using engineering controls to eliminate the gases.

The waste anesthetic gas studies increased awareness of the wide spectrum of reproductive outcomes of workplace exposures: menstrual irregularities, infertility, miscarriages, birth defects, stillbirths, low birth weight, increased infant and childhood morbidity and mortality, including growth retardation, and mild-to-profound intellectual deficits or emotional disturbances.

Toxic exposures may initiate damage before conception or during early pregnancy when an embryo is considered particularly vulnerable to either lethal or developmental effects. Exposures may have effects throughout pregnancy, for instance on the central nervous system, because the brain continues to develop throughout pregnancy and well into the first year of life. Breast-feeding in the case of a working mother is of concern; recent evidence has documented the presence in mothers' milk of pesticides, metals, solvents and other toxic materials from workplace and other environmental sources, occasionally at levels higher than accepted limits for cows' milk.

Clinicians should obtain occupational histories from both parents when exploring problems related to infertility or adverse pregnancy outcomes.

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Prevention of Cement Allergy

DERMATITIS RESULTING from allergic contact sensitivity to dichromate is uncommon among cement workers, but when it occurs it may be severe and persistent, frequently necessitating loss of a job and rehabilitation. Since 1950 this form of dermatitis has been known to be caused by minute amounts of hexavalent dichromate found in cement. It is important to differentiate this type of dermatitis from the irritant dermatitis that is experienced by cement workers from time to time and

is caused by the alkalinity and hygroscopic nature of cement.

Since the 1920s it has been recognized that conversion of hexavalent chromium to the trivalent form eliminates allergenicity almost completely. Recently Fregert in Sweden introduced a practical, simple way to reduce the hexavalent chromium in wet cement at the workplace immediately before its use. The method consists of adding small amounts of ferrous sulfate in an aqueous solution to the cement during the final mixing before it is poured. When used as recommended, the preparation in no way alters the characteristics of the resulting concrete.

Large studies of this procedure are in progress in Europe; it has not been used to any extent in the United States, however. The method is especially useful for small projects such as tile setting, where workers add the ferrous sulfate solution to the mix as the work progresses.

Because chromate cement dermatitis is a serious disease for which no effective treatment or preventive measures have been found, adding ferrous sulfate may prevent the development of new sensitizations to dichromate and reduce the severity of recurrences in persons already sensitized.

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Return to Work After Myocardial Infarction or Coronary Artery Bypass Operation

MORE THAN 500,000 persons survive myocardial infarction or coronary artery bypass operations in the United States each year. While those with persistent, severe physical impairment rarely return to work, most survivors are capable of reemployment. Many persons with little or no residual physical disability, however, return to work slowly or not at all. Several investigators have explored this phenomenon and have recommended therapeutic measures to enhance resumption of work.

Factors associated with delayed or no return to work include low educational level, advanced age, depression and maladaptive coping styles. Personal, local and national economics and cultural expectations further influence return-to-work patterns. Persons with an inappropriately pessimistic view of their medical prognosis have a low probability of returning to work. This is especially true when he or she attributes the cardiac event to job stresses. Less studied are the effects of self-confidence and self-efficacy.

A person's history and perception of prior work are also important. Self-employed persons consistently return to work earlier than others, regardless of the physical and emotional demands of their job. Those doing blue collar work for others have the slowest return to work rate. Those who perceive job stress, lack of job